Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. - 103. (Canceled)

104. (Currently Amended) Surface profiling apparatus for obtaining surface profile data for a sample surface, the apparatus comprising:

a light director operable to direct light from a light source along a sample path towards the sample surface and along a reference path towards a reference surface such that light reflected by the sample surface and light reflected by the reference surface interfere;

a mover operable to move at least one of the sample surface along the sample path or the reference surface along the reference path to effect relative movement between the sample surface and the reference surface along a measurement path;

a sensor operable to sense light intensity resulting from interference between light reflected from the reference surface and regions of the sample surface to provide a set of light intensity data comprising light intensity data values with each light intensity data value representing the sensed light intensity associated with a corresponding one of said regions, the sensor being operable to sense light intensity at intervals along the measurement path to provide a number of sets of such light intensity data;

a data processor operable to process the sets of light intensity data to determine from the light intensity data values associated with each sensed region a position along the measurement path at which a predetermined feature occurs in light intensity data for that sensed region; and

a surface profiler operable to determine from the positions at which the predetermined feature occurs in the light intensity data for the different sensed regions the relative surface heights of the different sensed regions to provide a surface profile,

the apparatus further comprising an image enhancer operable to enhance image data representing ~~a~~ one set of light intensity data to be displayed on a display to facilitate the detection by a user of the interference fringes, the image enhancer comprising at least one of:

a gradient determiner operable to determine from a set of light intensity data light intensity gradient data and a modifier operable to modify the image data to be displayed in accordance with the determined gradient data; or

a contrast determiner operable to determine contrast difference data by comparing the set of light intensity data with a reference set of light intensity data and a modifier operable to modify the image data to be displayed in accordance with the determined contrast difference data.

105. (Previously Presented) Apparatus according to claim 104, wherein the image enhancer comprises a gradient determiner operable to determine from a set of light intensity data light intensity gradient data and a modifier operable to modify the image data to be displayed in accordance with the determined gradient data.

106. (Previously Presented) Apparatus according to claim 104, wherein the image enhancer comprises a contrast determiner operable to determine contrast difference data by comparing the set of light intensity data with a reference set of light intensity data and a modifier operable to modify the image data to be displayed in accordance with the determined contrast difference data.

107. (Previously Presented) Apparatus according to claim 104, wherein the image enhancer comprises a gradient determiner operable to determine from a set of light intensity data light intensity gradient data, a contrast determiner operable to determine contrast difference data by comparing the set of light intensity data with a reference set of light intensity data and a modifier operable to modify the image data to be displayed in accordance with the determined gradient data and contrast difference data.

108. (Previously Presented) Apparatus according to claim 105, wherein the gradient determiner is operable to determine local gradient data associated with a light intensity data value by comparing the light intensity data values associated with regions on either side of the region that provided the light intensity data value.

109. (Previously Presented) Apparatus according to claim 107, wherein the regions are arranged in a rectangular array and the gradient determiner is operable to determine local gradient data associated with a light intensity data value by comparing the light intensity data

values associated with regions at respective ends of a diagonal containing the region associated with the light intensity data value.

110. (Previously Presented) Apparatus according to claim 105, wherein the regions are arranged in a rectangular xy array and the gradient determiner is operable to determine local gradient data associated with a light intensity data value associated with a region at coordinates x,y in the array by comparing the light intensity data values associated with regions at coordinates x+ 1, y+ 1 and x-1, y-1.

111. (Previously Presented) Apparatus according to claim 105, wherein the regions are arranged n a rectangular xy array and the modifier is operable to determine a modified intensity data value I_M for a light intensity data value I associated with the region at coordinates x,y in accordance with:

$$I_M = 64 + \frac{1}{2} + (I_{-1} - I_{+1})x4$$

where I_{+1} and I_{-1} are the intensity data values associated with the regions at coordinates x+1, y+1 and x-1, y-1, respectively.

112. (Previously Presented) Apparatus according to claim 106, wherein the contrast determiner is operable to determine the contrast difference data by subtracting from the intensity data value I of the set the corresponding intensity data value I_R of the reference set.

113. (Previously Presented) Apparatus according to claim 106, wherein the modifier is operable to determine a modified intensity data value I_M for a light intensity data value I in accordance with:

$$I_M = 64 + \frac{1}{2} + (I - I_R)x4$$

where I_R is the corresponding intensity data value of the reference set.

114. (Previously Presented) Apparatus according to claim 107, wherein the regions are arranged in a rectangular xy array and the modifier is operable to determine a modified intensity data value I_M for a light intensity data value I associated with the region at coordinates x,y in accordance with:

$$I_M = 64 + \frac{1}{2} + (I - I_R)x4 + (I_{-1} - I^{+1})x4$$

wherein I_{+1} and I_{-1} are the intensity data values associated with the regions at coordinates x+1, y+1 and x-1, y-1, respectively, and I_R is the corresponding intensity data value of the reference set.

115. (Previously Presented) Apparatus according to claim 106, further comprising a user operable device that enables a user to select the reference set.

116. (Previously Presented) Apparatus according to claim 104, wherein the image enhancer comprises a user-selectable filter device operable to restrict the wavelength range of the light source.

117. (Previously Presented) Apparatus according to claim 116, wherein the user-selectable filter device comprises a filter assembly mounted in a light path from the light source and having a housing having a filter carrier mounted in the housing so as to be rotatable about an axis, the filter carrier having a plurality of filters spaced around the axis and having a peripheral surface provided with land portions each associated with a corresponding filter and each distinguishable by a user for allowing a user to rotate the filter carrier to bring a selected filter to a predetermined position.

118. (Previously Presented) Apparatus according to claim 104, wherein the image enhancer is operable to cause the majority of the light intensity data values to appear to be represented by a single colour with the apparent lightness of the colour varying with the light intensity data value such that the lightness either increases or decreases with increase in the light intensity data value and to cause at least one of a light intensity data value representing a highest light intensity, a light intensity data value representing a lowest light intensity or light intensity data values representing midrange light intensities to be displayed so as to appear to be of a different colour to enable the user to identify the light intensity level represented by that light intensity data value.

119. (Previously Presented) Apparatus according to claim 118, further comprising a user-operable control that enables a user to control a light output intensity of the light source.

120. (Currently Amended) Apparatus according to claim 118, wherein the image enhancer is operable to cause at least two of the light intensity data value representing the highest light intensity, the light intensity data value representing the lowest zero light intensity ~~and~~ or the light intensity data values representing midrange light intensities to be displayed so as to

appear to be of different colours from the colour to enable the user to identify the light intensity level represented by that light intensity data value.

121. (Previously Presented) Apparatus according to claim 104, further comprising a surface form extractor operable to extract a form of the reference surface from the sets of light intensity data.

122. (Currently Amended) A data processing method comprising:

directing along a sample path towards the sample surface and along a reference path towards a reference surface such that light reflected by the sample surface and light reflected by the reference surface interfere;

moving at least one of the sample surface along the sample path or the reference surface along the reference path to effect relative movement between the sample surface and the reference surface along a measurement path;

sensing light intensity resulting from interference between light reflected from the reference surface and regions of the sample surface to provide a set of light intensity data comprising light intensity associated with a corresponding one of said regions so as to sense light intensity at intervals along the measurement path to provide a number of sets of such light intensity data;

processing the sets of light intensity data to determine from the light intensity data values associated with each sensed region a position along the measurement path at which a predetermined feature occurs in the light intensity data for that sensed region; and

enhancing image data to be displayed on a display to facilitate the detection by a user of the interference fringes in image data in response to user input, enhancing image data comprising at least one of:

determining a gradient from a set of light intensity data light intensity gradient data and modifying the image data to be displayed in accordance with the determined gradient data; or

determining contrast difference data by comparing the set of light intensity data with a reference set of light intensity data and modifying the image data to be displayed in accordance with the determined contrast difference data.

123. (Previously Presented) A method according to claim 122, further comprising determining from the positions at which the predetermined feature occurs in the light intensity data for the different sensed regions the relative surface heights of the different sensed regions to provide a surface profile.

124. (Canceled)

125. (Previously Presented) A storage medium carrying processor-implementable instructions for causing processor means to carry out a method in accordance with claim 122.

126. (Currently Amended) Surface profiling apparatus for obtaining surface profile data for a sample surface, the apparatus comprising:

light directing means for directing light from a light source providing means along a sample path towards the sample surface and along a reference path towards a reference surface such that light reflected by the sample surface and light reflected by the reference surface interfere;

moving means for moving at least one of the sample surface along the sample path or the reference surface along the reference path to effect relative movement between the sample surface and the reference surface along a measurement path;

sensing means for sensing light intensity resulting from interference between light reflected from the reference surface and regions of the sample surface to provide a set of light intensity data comprising light intensity data values with each light intensity data value representing the sensed light intensity associated with a corresponding one of said regions, the sensing means being arranged to sense light intensity at intervals along the measurement path to provide a number of sets of such light intensity data;

data processing means for processing the sets of light intensity data to determine from the light intensity data values associated with each sensed region a position along the

measurement path at which a predetermined feature occurs in the light intensity data for that sensed region; and

surface profile determining means for determining from the positions at which the predetermined feature occurs in the light intensity data for the different sensed regions the relative surface heights of the different sensed regions to provide a surface profile,

the apparatus further comprising image enhancing means for enhancing image data representing ~~a~~ one set of light intensity data to be displayed on a display to facilitate the detection by a user of the interference fringes, the image enhancing means comprising at least one of:

gradient determining means for determining from a set of light intensity data light intensity gradient data and modifying means for modifying the image data to be displayed in accordance with the determined gradient data; or

contrast determining means for determining contrast difference data by comparing the set of light intensity data with a reference set of light intensity data and modifying means for modifying the image data to be displayed in accordance with the determined contrast difference data.

127. (Currently Amended) Surface profiling apparatus for obtaining surface topography data for a surface of a sample, the apparatus comprising:

a sample support;

a light director operable to direct light along a sample path towards the sample surface and along a reference path towards a reference surface such that light reflected by corresponding regions of the sample surface and the reference surface interfere;

a mover operable to effect relative movement along a measurement path between the sample surface and the reference surface;

a sensor operable to sense, for each of a number of regions of the sample surface, light representing the interference fringes produced by that sample surface region during said relative movement;

a controller operable to carry out a measurement operation by causing said mover to effect said relative movement while said sensor senses light intensity at intervals to provide, for each of the number of regions, a set of intensity values representing interference fringes produced by that region during said relative movement;

a data processor operable to process the sets of light intensity data to determine from the light intensity data values associated with each sensed region a position along the measurement path at which a predetermined feature occurs in the light intensity data for that sensed region; and

a surface topography determiner operable to determine from the positions at which the predetermined feature occurs in the light intensity data for the different sensed regions the relative surface heights of the different sensed regions to provide surface topography data,

the apparatus further comprising:

a reference calibrator operable to calibrate the apparatus to compensate for surface features of the reference surface, the reference calibrator comprising:

a user operable calibration initiator operable to initiate a calibration;

a calibration controller operable to cause, in response to operation of the calibration measurement initiator, operation of the controller, data processor and[[

]] surface topography determiner to carry out a number of calibration measurement operations to obtain in each calibration measurement operation calibration surface topography data for the calibration sample;

a surface topography data processor operable to process the calibration surface topography data obtained in the calibration measurement operations; and

a mean surface calculator operable to calculate mean surface topography data using the processed calibration surface topography data to obtain reference surface features data to enable the reference surface features to be taken into account for surface topography data obtained in a subsequent measurement operation.